Effective Safety Programs:

The Role of the Occupational and Environmental Health Nurse

By

Susan Stailing

University of North Carolina at Chapel Hill

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Approved by:

Judith S. Ostendorf Advisor

Susan A Rudolph Reader

Abstract

Safety programs have been in place since the early 1900's. Early programs focused on poor physical work conditions and as improvements were made to these conditions, fatalities have decreased. Programs following that era proceeded to focus on the worker and not the environment. Since that time, safety programs have undergone metamorphic changes that now focus not only on the work environment, but also the psychology behind employee safety.

With the passage of Public Law 91-596, the OSH Act (1970), employers are required to provide employees "a place of employment which is free from recognized hazards that are causing or are likely to cause death or serious physical harm" (p. 4). As part of this Act, the Occupational Safety and Health Administration (OSHA) also provides services to assist employers in providing a safe environment. Some of these services include training programs and material, inspections of worksite to assist in identifying hazards, and technical assistance related to workplace hazards.

In addition to OSHA, a variety of other organizations have expertise in safety. Members of these associations include nurses, engineers, industrial hygienists, and safety professionals. As a member of one of these organizations, the occupational and environmental health nurse (OEHN) is in a unique position to provide services related to the safety of employees and their environment. The purpose of this paper is to evaluate safety programs, the impact of regulatory and non-regulatory agencies as part of the interdisciplinary team, and the role of the OEHN in safety programs.

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I would like to thank my husband for giving me the encouragement and support over the course of the past three and half years to bring my dream of earning an advanced degree to fruition. During those times that I did not believe I could continue, your gentle prodding reminded me of why I chose to pursue this goal. To my two little four legged children, Psycho and Bandit, I appreciate the many times you sat on my books and papers reminding me it was time to take a break and enjoy life. It is because of all of you I have succeeded.

EFFECTIVE SAFETY PROGRAMS:
THE ROLE OF THE OCCUPATIONAL AND ENVIRONMENTAL HEALTH NURSE

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CHAPTER 1

INTRODUCTION

Since the 1900's, safety has progressed through multiple eras (Peterson, 1975). In the early 1900's, the Inspection Era focused on improving the physical work environment. The "Unsafe Act and Condition Era" followed and it concentrated on unsafe acts as the primary cause of injuries. Following this was the "Industrial Hygiene Era", which focused on occupations and the diseases that were specific to them. This was followed by the "Noise Era" which was a result of hearing loss from the work environment and finally the "Psychology of Safety Management Era" of the 1970's (Sarkus, 2001). It was in 1970, with passage of the Occupational Safety and Health Act, that employee safety was brought to the forefront. The Occupational Safety and Health Administration (OSHA) began to hold industry accountable for the number of injuries and deaths that were occurring in the workplace.

Safety statistics are an attempt to give us a glimpse of the number of injuries that occur within a given year. Although this statistic will give us a number to compare with other industries, it does not always give accurate data regarding the effectiveness of a safety program. We must ask ourselves, "what is a truly effective safety program"? Is it merely the numbers that are generated throughout the year as accidents accumulate? Possibly it is the number of employees that participate in safety events. What numbers are used? Is it the number of injuries or is it the number of safe acts that are noticed?

As employers continue to search for ways to improve these statistics and motivate their employees to engage in safe behaviors that will reduce injuries, they must realize they also play an important role. Consideration must be given to the work environment that they provide the employee. While traditional safety programs focus on engineering changes, administrative controls, and personal protective equipment (Waters & Duncan, 2001), employers must also focus on the safety culture of the organization. "Culture within organizations exerts a powerful influence on the types of decisions that are made, the kinds of information that are shared, when and in what manner information is disseminated, who is considered powerful, and what employee behaviors are deemed acceptable" (Rogers, 1994, p. 177). Does management emphasize production over safety? Alternatively, is more emphasis placed on providing a safe work environment? An organization's culture will influence the number of injuries that occur and the success of a safety program.

Employees must also assume responsibility for their safety. Even if employers offer the safest environment, they cannot always control the behaviors of their employees. It has been clearly shown that some employees will continue to engage in unsafe behaviors even after an injury has occurred. This may be evidenced by employees who remove their fall protection once out of the sight of management, or employees who fail to "lock out" as procedures indicate must be done. Although employees must be given the appropriate training to perform their jobs, they too must assume responsibility for their own behaviors.

Many safety programs that are available today address the issue of employee behaviors and the responsibility of the employer. While some of these programs place emphasis on the employee, others have done very well in including management in the safety process. Three programs that are considered effective among safety and health professionals are Behavior Based Safety, Integrated Safety Management Systems used by the Department of Energy, and the Safety Training Observation Program implemented by Dupont. Although all three focus on the behavior of the employee, each one has a different implementation process.

Another program used to promote safety is an incentive program. This program has been shown to decrease the number of injuries, although the way it is achieved is controversial. As such, OSHA has become very skeptical of organizations that use an incentive program without the incentives being part of a comprehensive safety program (Magnum, 2001).

There are multiple regulatory and non-regulatory agencies as well as different professional organizations available to industry to assist in establishing an effective safety program that will decrease their work-related injuries. Examples of these resources are OSHA, National Institute of Occupational Safety and Health, National Safety Council, American Association of Occupational Health Nurses, American Industrial Hygiene Association, and the American Society of Safety Engineers.

Occupational and environmental health nurses are in a unique position to assist industry in implementing an effective safety program. As a "specialty

practice that provides for and delivers health care to workers and worker populations" (AAOHN, 2003a), the occupational and environmental health nurse (OEHN) should know first hand the impact of injuries in the work force. These injuries not only affect the employer and fellow workers, but also the employee and their families. The OEHN usually responds to and treats the initial injury, refers to appropriate health care provider, and provides case management until the injured employee returns to work.

Although treatment of injuries and case management is one function of the OEHN, it is important to remember that this individual can also provide a variety of other services. The OEHN is uniquely trained to identify illnesses and injuries associated with the work environment and make recommendations to mitigate these hazards. In addition, this person may also serve as a resource in providing safety training and implementing a safety program that will reduce workplace injuries.

An effective safety program is derived from multiple components. Some of these components include the culture of an organization and the commitment of management, the employee's personal beliefs regarding safety, and resources available to assist the organization with hazard identification and the implementation of an effective safety program.

The purpose of this paper is to explore a few of the safety programs that have influenced worker safety, identify the different agencies and associations that impact workplace safety, and to discuss the role of the OEHN in workplace safety as part of an interdisciplinary team.

CHAPTER II

REVIEW OF LITERATURE

Many organizations provide safety training materials, seminars, and consultation to employers on safety programs. Most advertise that their program is the best and that implementing their program will result in fewer workplace injuries. This leads one to question what is an effective safety program. The following are programs considered successful among employers, employees, safety professionals, and the occupational health community.

Behavior Based Safety Programs

Behavior based safety programs first became popular in the 1930's and 1940's when H.W. Heinrich, an Assistant Superintendent of the Engineering and Inspection Division of Travelers Insurance Company, proposed that injuries were primarily caused by unsafe acts (Transport Workers Union of America, 2003). As its name implies, behavior based safety is a process that focuses on the behavior of an individual. It is a process that "engages personnel at all levels of an organization to reduce rates of at-risk behavior and raise the rates of identified safe behaviors" (Hodson, 1999, p. 11). According to Hodson (1999), the behavior based process focuses on the following four key activities:

- identifying critical behaviors;
- gathering data;
- providing ongoing, two-way feedback; and
- removing barriers to continuous improvement.

Identification of critical behaviors involves reviewing near misses/near hits to evaluate at-risk behaviors that may contribute to the most serious injuries. Research has indicated that 90-95% of incidents may be caused by 20-35% of at-risk behaviors (Hodson, 1999). Some of these at-risk behaviors may include an employee not wearing safety glasses, working at an elevation without a barrier to protect objects from falling on workers below, placing hands in nip points, and not wearing hearing protection in posted areas.

Gathering data involves using a critical behavioral checklist, Figure 2.1, to objectively identify critical behaviors, both desired or undesired. This checklist observes body positioning and use of personal protective equipment (PPE), visual focusing, communicating, pacing of work, body mechanics used to move objects, lockout/tagout compliance, and permit compliance. The checklist may be generic to encompass several different tasks, or job-specific (Geller, 2001). It is believed that an increase in injuries will correlate with the number of at-risk behaviors observed. After compiling the information from the checklist, the observer shares the results with fellow employees to identify critical behaviors that may increase the risk of injury (Krause, 1999). According to Geller (2001), critical behaviors include:

1. behaviors that have led to a large number of injuries or near hits;
2. behaviors that could contribute to a large number of injuries or near hits because a large number of the employee population engage in the behavior;
3. behaviors that have previously resulted in a serious injury or fatality; and

FIGURE 2.1

Critical Behavior Checklist

Task Observation	Safe Observation	At-Risk Observation
BODY POSITIONING/PROTECTING body parts (e.g. using PPE, guards on equipment, barricades, avoiding line of fire, etc.)		
VISUAL FOCUSING Eyes and attention devoted to task(s)		
COMMUNICATING Verbal or nonverbal interaction that affects safety		
PACING OF WORK Rate of ongoing work is appropriate (e.g., spacing breaks, rushing)		
MOVING OBJECTS Body mechanics while lifting, pushing/pulling		
COMPLYING WITH LOCKOUT/TAGOUT Following procedures for lockout/tagout		
COMPLYING WITH PERMITS Obtaining, then complying with permit(s). (e.g. confined space entry, hot work, excavation, etc.)		

(Adapted from Geller, 2001)

4. behaviors that could result in a serious injury or fatality.

Providing on-going, two-way feedback is very important in a behavior based safety program. This involves sharing both safe and unsafe behaviors. Rewarding feedback to emphasize safe behavior and using corrective feedback to decrease at-risk behaviors should be used (Geller, 2001). According to Geller (2001) feedback for both safe and at-risk behaviors should be private, one-on-one, and be given as soon as possible after the observation. It is also important that "concern should be given for the person's welfare" and that a safe alternative to this behavior be identified (p. 171). Geller (2001) also recommends that individuals displaying the at-risk behavior should give a commitment to the observer that they will avoid the behavior in the future.

Barriers to continuous improvement must also be removed. This involves using comments and observation data to target areas that have not progressed accordingly. (Hodson, 1999). For example, an area of a manufacturing process continued to have a large number of lacerations from using utility knives. Upon review, it was discovered that employees had not been using protective gloves on the opposite hand of the cutting hand because the gloves were only available in one size and did not fit all of the employees. Once this was identified, a larger variety of gloves was ordered so that different sizes were available to all employees. Once gloves in different sizes were available, employees started to wear them and lacerations dramatically decreased.

Another important component of behavior based safety is the culture of the safety program and/or process. Culture includes the values and assumptions

that people, or an organization, have in common. In a Total Safety Culture, safety is shared and everyone feels responsible and works to impact safety on a daily basis (Geller, 2001; Sloat, 1999). It is important to note that this responsibility is shared equally among all employees. According to Geller (2001), a Total Safety Culture requires attention to three domains:

1. environmental factors;
2. personal factors; and
3. behavioral factors.

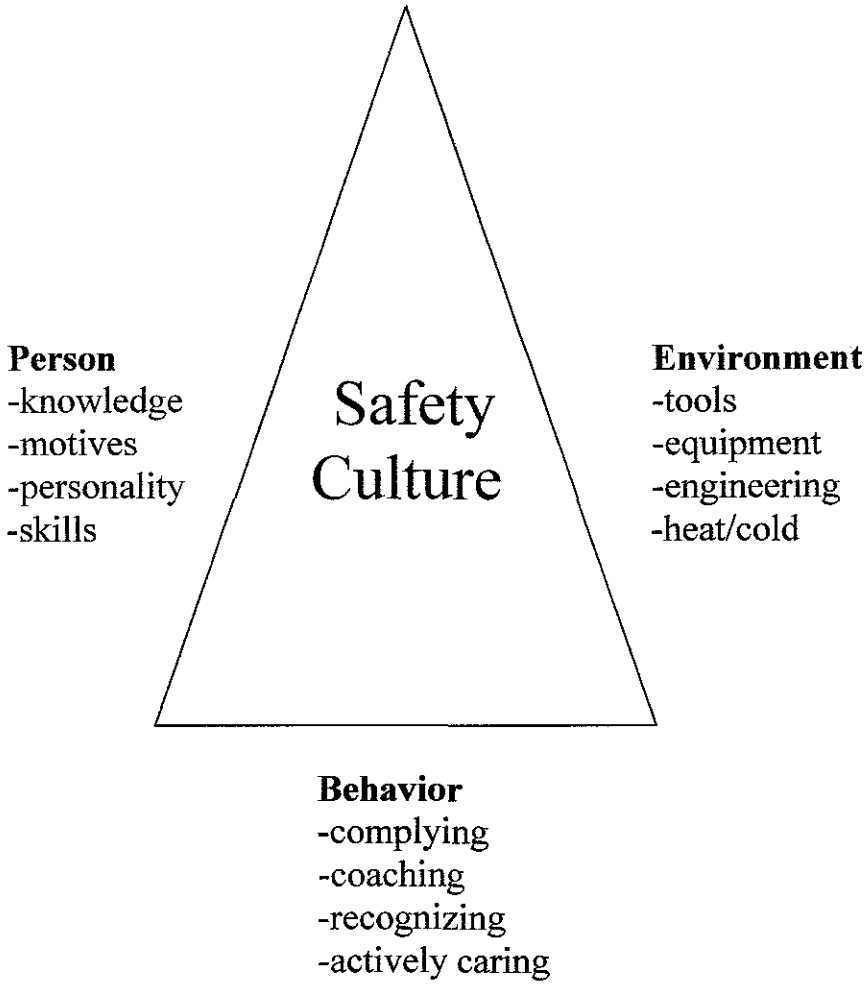
Environmental factors include equipment, housekeeping, heat/cold, tools, the physical layout of a process, etc. Personal factors are the beliefs, attitudes, and personalities of the workforce. Behavioral factors are the safe and at-risk work practices of the workforce. Behavioral factors also include employees intervening on behalf of other employees' safety (Geller 2001).

In a Total Safety Culture, all members of the domain are interdependent. Any change to one domain of the trilogy will directly impact the others, Figure 2.2. For example, "Behaviors that reduce the probability of injury often involve environmental change and lead to attitudes consistent with the safe behaviors" (Geller, 2001, p. 19).

A behavior based safety program that exhibits the Total Safety Culture will promote employee involvement, teamwork, training, and leadership. It will also reinforce the need for employees to actively care for their fellow employees, and will give employees empowerment to address the safety of their environment and the behavior of other employees (Geller, 2001).

FIGURE 2.2

Total Safety Culture Trilogy



(Adapted from Geller, 2001)

Many corporations attribute an increase in safe behaviors and a decrease in injuries while using this program. The Los Alamos National Laboratory's Plutonium Facility implemented the behavior based safety program in 2000. Since that time, they have seen an increase in safe behaviors with a decrease in injuries. From March of 2000 to February of 2001, the total recordable injury rate dropped from 4.25 for 1,457,238 man-hours worked to 2.60 for 1,309,580 man-hours worked (Wieneke, 2001). This statistic correlates with their observation data that shows that 93% of observations in April of 2001 were found to be safe.

Behavior based safety is a program that, rather then focusing on the person, focuses on the behavior of the individual. This program operates primarily on the premise that injuries can be reduced by reducing the number of at-risk behaviors.

Integrated Safety Management Program

Integrated Safety Management (ISM) is a safety program that is utilized by the Department of Energy (DOE) and integrates safety awareness and good practices into all aspects of work. The DOE believes that "work should be conducted in such a manner that protects workers and other people, and does not cause harm to the environment" (Department of Energy [DOE], 2003, pg. 1). ISM also believes that safety is not a stand-alone program, but rather is an integral part of each employee's job.

ISM is also considered a type of a behavioral safety program. Unlike behavior based safety, ISM places a greater emphasis on management responsibility. The overall safety goal is to create and maintain a workplace free

of occupational injuries and illnesses by using employee involvement and management leadership. Not only is ISM committed to the health and safety of its employees, it is also committed to the health and safety of the public and the environment. This is evident in the seven guiding principles of the program (DOE, 2003).

The first principle is Line Management Responsibility for Safety. Line management has the direct responsibility for safety and health of the workers, environment, and the protection of the public (DOE, 2003). It is their responsibility to integrate the various safety and health activities within the workplace to ensure that safety of employees is maintained.

Clear Roles and Responsibilities is the second principle of ISM. The DOE also believes that safety should be established and maintained at all levels of the Department. As a way to ensure this, the DOE states that there should be "clear and unambiguous lines of authority and responsibility" (DOE, 2003).

The third principle is the Principle of Competence Commensurate with Responsibilities. This principle states, "Personnel shall possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities (DOE, 2003, p. 2). As part of this principle the DOE provides training that is general, site specific, or task specific depending upon the level of knowledge needed to perform a task. This training is provided to employees to ensure that they are aware of the hazards in their work areas and how the hazards can be controlled.

Balanced Priorities is the fourth principle and states "Resources shall be effectively allocated to address safety, programmatic, and operational considerations" (DOE, 2003, p. 2). This principle addresses the belief that employees, the public, and the environment are a priority throughout the work process.

The fifth principle, Identification of Safety Standards and Requirements, requires that a hazard evaluation be performed by qualified personnel before starting the work process. If hazards are present, safety standards must be established to assure that the worker, public, and environment are protected from any adverse outcome (DOE, 2003).

Hazard Controls Tailored to Work Being Performed is the sixth guiding principle. According to the DOE, its driving premise is that engineering and administrative controls must be in place to prevent and mitigate hazards (2003). Rather than relying directly upon employee behavior, the DOE strives to engineer the hazard out of the work environment. For example, both stationary and portable fume hoods are used to exhaust radiological waste away from employees. When this is not possible, administrative controls are implemented. A control that would be used when fume hoods do not remove the hazard, or when air samples indicate higher than acceptable levels, is limiting the amount of time the worker is in the area. The final principle, Operations Authorization, states, "The conditions and requirements to be satisfied for operations to be initiated and conducted shall be clearly established and agreed-upon" (DOE, 2003, p. 2). "The extent of documentation and level of authority for agreement shall be tailored to the

complexity and hazards associated with the work and shall be established in a Safety Management System [48 CFR 970.5204(b) (7)]. The manager of the facility is responsible for authorizing all work that takes place, regardless of the type of work, or who is performing it. Once authorized, work is executed according to the procedures. Line supervisors are responsible to ensure that work controls remain in place. Employees are trained in hazard recognition and their rights and responsibilities to stop work at any time if their safety is compromised.

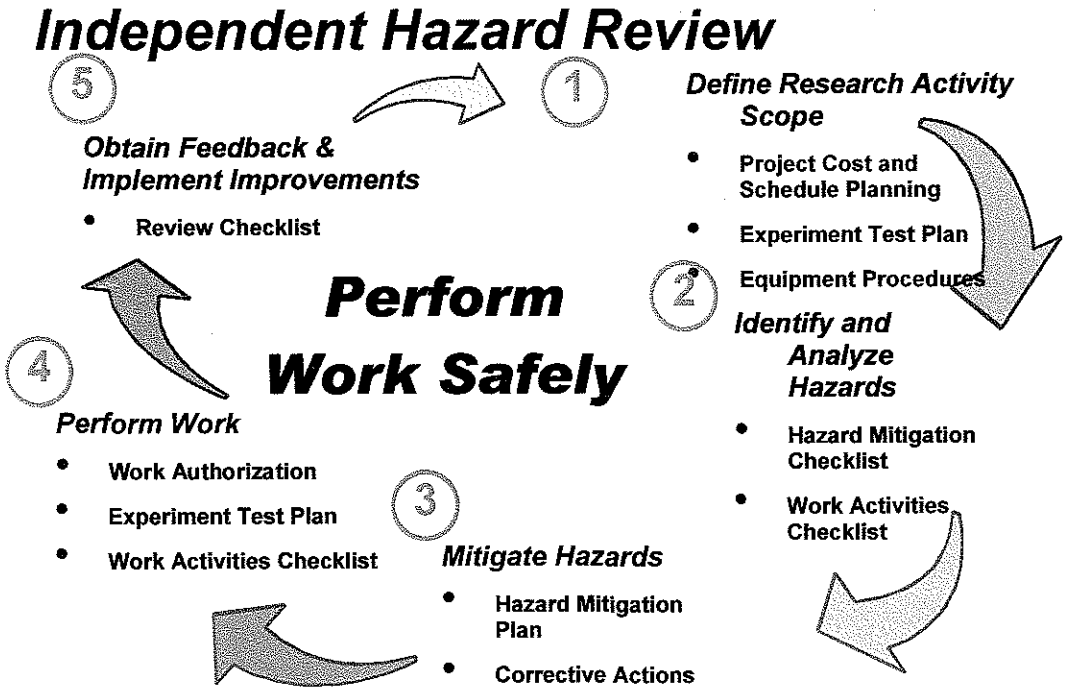
In addition to the seven Guiding Principles, the DOE also defines five Core Functions of ISM. It is important to note that the Guiding Principles and Core Functions interrelate and each one directly affects safety, Figure 2.3. The five Core Functions of ISM are:

- define the scope of work;
- analyze the hazards;
- develop and implement hazard controls;
- perform work within controls; and
- provide feedback and continuous improvement.

Defining the scope of work involves determining what tasks or work are scheduled to be performed. This process also involves "identifying problem areas, the resources needed and available, and then prioritized" (Waters & Duncan, 2001, p. 1524). Once this is done, resources are allocated accordingly to ensure that the work process is performed safely (DOE, 2003).

FIGURE 2.3

Integrated Safety Management Hazard Review



Adapted from Department of Energy

Analyzing the hazards involves reviewing the work scheduled to be performed and performing hazard identification. Once this is done, the hazards are then analyzed and categorized according to severity. Part of this hazard identification involves identifying "safety critical behaviors" that directly impact safety. This assessment includes reviewing previous injuries and the behaviors and environment that contributed to them (Waters and Duncan, 2001).

Analyzing hazards provides the foundation for the third core function, developing and implementing hazard controls. The development and implementation of hazard controls requires identifying and reviewing applicable standards and requirements. Once this is performed, controls can be implemented that will mitigate present hazards. ISM is a system that proactively recognizes and minimizes hazards to create a work environment that is free from work injuries and illnesses (DOE, 2003).

Once controls are in place, it then becomes important that all work is done within the parameters that have been established. Deviating from any of the controls established should involve discontinuation of the work process until the hazards are reanalyzed and other controls have been implemented.

According to the DOE, the final Core Function evaluates the adequacy of the controls and looks at opportunities that may improve the work process. Feedback from employees is imperative in the process to ensure that any opportunities for improvement are identified and implemented. Management and independent oversight is conducted during this function and, if necessary, "regulatory enforcement actions occurs" (DOE, 2003, p. 3).

Since implementing the ISM system at industrial sites (Savannah River Site and the Strategic Petroleum Reserve) and at national laboratories (Los Alamos National Laboratory, Idaho National Engineering and Environmental Laboratory, and the Lawrence Berkeley Laboratory) the DOE has seen "an increase in safe behavior and a decrease in overall safety incidents" (Waters & Duncan, 2001, p. 1524). This decrease is being credited to the success of the ISM system.

Safety Training Observation Program™

In addition to aforementioned safety programs, another program that has influenced workplace safety is DuPont's Safety Training Observation Program (STOP.) DuPont is considered a leader in safety and has decreased its injuries by over 60% in the past 10 years (Vinas, 2003). The DuPont safety program is a behavior based observation program that focuses on the following principles:

- all injuries and occupational illnesses can be prevented;
- safety is everyone's responsibility;
- management is directly accountable for preventing injuries and occupational illnesses;
- safety is a condition of employment;
- training is an essential element for safe workplaces;
- safety audits must be conducted;
- safe work practices should be reinforced and all unsafe acts and unsafe conditions must be corrected promptly;

- it is essential to investigate injuries and occupational illnesses, as well as incidents with the potential for injury;
- safety off the job is an important element of the overall safety effort;
- preventing injuries and occupational illnesses are good business; and
- people are the most critical element in the success of a safety and health program.

According to STOP, safety begins when employees are alert to their surroundings, alert to what they are doing, and aware of what is going on around them (DuPont, 1995). DuPont emphasizes that when employees are more aware of their surroundings, they "can better recognize and eliminate the cause of injuries" (Dupont, 1995, p. 6). Early recognition allows the employee to eliminate unsafe acts and injuries as well as unsafe conditions.

Over 90% of work injuries can be attributed to the unsafe acts of people (DuPont, 1995). Unsafe acts are something that individuals perform that can cause accidents and injuries. These acts must be eliminated to prevent accidents and injuries and to decrease unsafe conditions. "A safe behavior is one that does not expose the employee or others to the risk of injury" (Dupont, 1995, p. 10). Unsafe conditions may be a direct result of an unsafe act. An example is the employee that spills oil on the floor and, rather than take the time to clean it up, chooses to ignore it. Another employee comes along later, slips and falls on the

oil left behind, injuring his back. This unsafe act created an unsafe condition that resulted in an injury.

It is important to note that the employee who slipped and fell on the oil is not without fault. According to DuPont, employees need to be aware of their surroundings to prevent injuries (Dupont, 2000). If the employee had observed the oil on the floor, he/she could have averted the injury that occurred. STOP emphasizes that employee must:

1. decide that safety is a priority;
2. stop and give their full attention to their work area;
3. observe any unsafe conditions or acts;
4. think about what has been observed and if there are any alternatives to performing the task; and
5. act by applying good judgment to eliminate and avoid unsafe acts and conditions.

Management is also responsible for preventing workplace injuries and illnesses. In addition to eliminating or minimizing work hazards, they also have the responsibility to provide safety training (DuPont, 2000). Safety awareness is a learned process and must involve all levels of management. As such, management must train employees in the identification and mitigation of safety hazards. Dupont also emphasizes that safety is a condition of employment and that working safely is an expectation of all employees (DuPont, 1995).

STOP encourages self and total observation. Self-observation involves employees monitoring themselves as they do a specific work function. Total

observation involves paying attention to everything seen, heard, felt, and smelled to ensure that the employee's work area is safe (DuPont, 2000). Part of this observation is utilizing the STOP Observation Checklist. A similar checklist can be found in Figure 2.4. The sample observation checklist includes reactions and positions of people, personal protective equipment (PPE), tools and equipment, and procedures and orderliness. The back of the sample observation checklist contains an observation report that must also be completed. This report (Figure 2.5) lists the safe and unsafe acts observed and what action was taken with the observed employee. It also indicates if it was a planned or unplanned observation and the signature of the individual making the observation.

Procedures "are the proven, step-by-step way to do a job safely. Orderliness is having a safe place for tools, equipment, and materials and then arranging them so they create safe working conditions" (DuPont, 2000, p. 19). STOP emphasizes that management must make job procedures and orderliness standards "available, adequate, known and understood, and followed" (Dupont, 2000, p. 20). Management also has the responsibility to provide the correct tools, equipment, and PPE to perform the work process safely.

DuPont's STOP program also indicates that the positions and reactions of people directly affect safety. Some positions that may increase injuries and illnesses include striking against, being struck by, caught in, on, or between objects, falling, and overexertion (DuPont, 2000). Reactions include adjusting PPE, changing positions, rearranging the job, stopping the job, and using lockout/tagout. Positions and actions of employees are a very important factor in

FIGURE 2.4

Sample STOP Observation Checklist

Reactions of People	**Positions of People**
□ Adjusting PPE	□ Striking Against
□ Changing Position	□ Struck By
□ Lockouts	□ Caught In, On, or Between Objects
□ Rearranging Job	□ Falling
□ Stopping Job	□ Overexertion
Personal Protective Equipment	**Tools and Equipment**
□ Head	□ Wrong for the Job
□ Eyes and Face	□ Used Incorrectly
□ Ears	□ In Unsafe Condition
□ Respiratory System	□ Correct for the Job
□ Hands and Arms	
□ Trunk	
□ Feet and Legs	
Procedures and Orderliness	
□ Inadequate	
□ Not known/Understood	
□ Not Followed	
□ Correct	

FIGURE 2.5

Sample Observation Report

Job Observation Safe & Unsafe Acts Observed Safe □ Unsafe □	1. Immediate Corrective Action 2. Action to Prevent Recurrence 3. Discussion with Employee
Planned □ Unplanned/Impromptu □	
Observers Signature_____ Date_____	

safety and have been shown to account for 30% of injuries (DuPont, 2000). Eliminating or decreasing the number of unsafe positions can dramatically impact safety.

DuPont also emphasizes that safety off the job is a very important element in the overall safety effort. The employee who works safely at home will be more inclined to work safely in the workplace. In addition, a healthy and injury free employee is able to contribute to productivity in the work environment as well as provide for the well being of their families (DuPont, 1995).

DuPont focuses on three essential elements for safety management:

- leadership;
- organizational; and
- operational.

Leadership elements emphasize strong management commitment, safety policies and principles, challenging goals and plans, and high standards of performance. Organizational elements include progressive motivation, safety as line-organization responsibility, supportive safety personnel, and progressive motivation. Finally, operational elements focus on effective communication, continuous safety training and development, injury and incident investigations and reports, and effective audits and re-evaluation (Vinas, 2003).

DuPont's STOP is a very successful program that boasts clients like General Motors Corp., General Electric Co., and Alcoa Inc., to name a few. The success of its program can be attributed to the extensiveness of the program and the involvement of everyone in safety, including management.

Safety Incentive Programs

Safety incentive programs, while successful in decreasing the number of work injuries, are highly controversial. Most companies will agree that good safety performance should be recognized and rewarded; the question remains how to implement a program that rewards employees for working safely and does not impede reporting injuries (Pardy, 1997).

Safety incentive programs have been referred to as recognition and safety awards programs. According to Bach (2000, p. 103), these programs "work because management, unions, and employees pull together and respond positively for the carrot/award-earning opportunity." Whatever these programs are called, they all reward the employee in some way. Usually this reward is in the form of money, paid days off, or gifts.

The way an employee is rewarded is dependent upon the type of program in place. Atkinson (2000) and Magnum (2001) describe four different types of programs:

- traditional;
- behavior-based;
- non-traditional; and
- custom-designed.

The traditional program is result oriented and offers rewards and/or recognition to employees that work a specific period or time without an OSHA recordable injury or illness. Some programs will also recognize employees for not having any "lost time" injuries. Research has shown that while some companies that utilize this

program may see a decrease in injuries, the severity of injuries has not changed (Atkinson, 2000). The reason for this is that hazards in the workplace and employee behavior have not been addressed.

The second type of safety incentive program is behavior based and offers rewards for safe behaviors that are identified rather than the number of days worked without an injury. This type of program will reward employees when proper lifting techniques are identified, proper PPE is worn, or employees are observed making an extra effort to ensure that their work environment is maintained safely. This may be evidenced by the employee cleaning up after a spill, etc.

Non-traditional safety incentive programs focus on the activities of employees. Rewards and recognition are given to "employees for participating in specific activities, such as making suggestions or participating in projects that ultimately improve safety performance in the organization" (Atkinson, 2000, p. 34).

Custom-designed safety programs take a comprehensive approach to safety and involve everyone within the company. These programs help companies keep safety at the forefront and reward employees for appropriate behavior and identification of potential hazards; they also encourage training. This type of program is often set up on a points based system and rewards employees with points when various behaviors and activities are observed (Mangum, 2001). One advantage of this type of program is the ability to focus on both team safety and individual safety.

While safety incentive programs can make a positive impact on safety numbers in the workplace, it is important that they are implemented in a way that will promote safety. A downfall of some programs, especially traditional, is the tendency to drive injury reporting underground (Krause, 1999). It is essential that employees report injuries so that a root cause analysis can be conducted to prevent future injuries. A root cause analysis is a method to determine if, and what, failure or fault led to an injury. It determines what chain of events took place and what is needed to be done to correct the failure or fault. Without a root cause analysis injuries will continue to occur. If injuries are not reported because an employee fears intimidation from management or co-workers, the incentive program must be re-evaluated.

CHAPTER III

IMPACT OF REGULATORY/NON-REGULATORY AGENCIES AND PROFESSIONAL ORGANIZATIONS ON SAFETY

Federal regulatory/non-regulatory agencies as well as different professional organizations have dramatically impacted workplace safety over the years. A decline in workplace injuries and illnesses can be directly related to their formation. It is important to understand who these agencies and organizations are and their contribution to safety.

Occupational Safety and Health Administration

The Occupational Safety and Health Administration (OSHA) is a federal agency within the Department of Labor that is responsible for workplace safety and health. It has the responsibility for enacting, administering, and enforcing standards to assure safe and healthful working conditions (Occupational Safety and Health Administration [OSHA], 2003a). Currently the OSH Act does not apply to self-employed persons, family farms, state and local governments, and industries regulated by other federal agencies, i.e., mining and aviation but does apply to employees and employers within the U.S. and any territory under U.S jurisdiction (Salazar, 1997).

The OSHA General Duty Clause states that every employer "shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees" (OSHA, 2003b, p. 1). As such, OSHA has provided safety and health standards that will eliminate and reduce risks of

hazards in the workplace. Some examples of these are the Hazard Communication Standard, Asbestos Standard, and the Bloodborne Pathogens Standard (Salazar, 1997).

In addition to the health and safety standards, OSHA also provides compliance assistance and an extensive array of training and informational materials to assist the employer in providing a safe work environment. Free workplace consultations are also available to employers who need assistance in establishing safety and health programs. In addition, Compliance Assistance Specialists in local offices are available to provide specific training to employers and employees (OSHA, 2003c). There is no question that OSHA has impacted safety in the workplace. This is evidenced by the overall on-the-job-injury and illness incidents rates dropping from 11.0 in 1973 to its lowest level of 5.7 in 2001 (OSHA, 2003d).

National Institute for Occupational Safety and Health

With the passage of the OSH Act in 1970, the National Institute of Occupational Safety and Health (NIOSH) was established as an institute within the United States Public Health System (Salazar, 1997). Although NIOSH is a federal non-regulatory agency, it is currently part of the Centers for Disease Control and Prevention (CDC). This agency is responsible for:

- enumerating hazards present in the workplace;
- identifying causes of work-related diseases and injuries;
- evaluating the hazards of new technologies and work practices;
- creating ways to control hazards;

- training safety and health professionals; and
- recommending the development of occupational safety and health standards (National Institute for Occupational Safety and Health [NIOSH], 2003a).

The mission of NIOSH is to prevent work-related illness, injury, and death. Employees of NIOSH have a wide range of disciplines that include medicine, engineering, statistics, nursing, industrial hygiene, and epidemiology that work toward this mission. This diverse population conducts a wide range of research, training, and technical assistance programs to identify and reduce hazardous working conditions (NIOSH, 2003 b, c).

In addition to the above, NIOSH also conducts Health Hazard Evaluations (HHE) in the workplace to determine if health hazards are present and to recommend abatement methods for these identified hazards. These evaluations are conducted under the authority of the OSH Act of 1970 (NIOSH, 2003d). Requests for a HHE may come from employees, employee representatives, or employers. Requests are generally made when employees identify an unsafe condition that they want the employer to mitigate. They may also request a HHE if enforcement is needed from OSHA.

Employers may request a HHE when they need assistance in complying with OSHA standards or if they would like a consultative OSHA inspection without penalties. They may also request this assistance if they need help with developing occupational safety and health programs (NIOSH, 2003d). NIOSH will evaluate these requests to determine if there is a health hazard caused by

exposure to hazardous materials, potential hazardous working conditions, or musculoskeletal stresses (2003d).

The HHE program offers occupational health services, which permit employers, employees, and their employee representatives to benefit from the results of NIOSH evaluations.

> "It provides a mechanism to obtain a scientific and professional evaluation of even those types of agents or working conditions for which OSHA has no standards or for which existing OSHA standards may not be protective for all workers. This process provides a way for requestor to profit from NIOSH research and recommendations on potential health hazards of immediate concern to them. If a medical study is necessary to determine whether a health hazard exists or whether employees are suffering from harmful effects of exposures, NIOSH can provide medical evaluations as part of the HHE process" (NIOSH, 2003d, p. 8).

The work of NIOSH has and will continue to impact worker safety and health in the workplace through research, training, and technical assistance. In conjunction with OSHA, NIOSH should be an integral part of every corporation's safety program.

American National Standards Institute

The American National Standards Institute (ANSI) is a private, non-profit organization that has served as administrator and coordinator of the United States private sector voluntary standardization system (American National Standards Institute [ANSI], 2003a, b). Since its formation in 1918, ANSI's mission has

been to "enhance both the global competitiveness of the U.S. business and the U.S. quality of life by promoting and facilitating voluntary consensus standards and conformity assessment systems, and safeguarding their integrity" (ANSI, 2003a, p. 1).

In 1976, ANSI and OSHA established a joint coordinating committee. This committee was formed to "provide for better private-public sector communication regarding voluntary standards activities that affect safety and health in the workplace (ANSI, 2003c, p. 3). As a result, workplaces have seen an increase in safety in areas such as safety glasses and footwear, eyewash stations, respirators, and standards for exhaust systems, to name a few. OSHA often will refer to ANSI standards and approved items when addressing the criteria for personal protective equipment (PPE).

National Safety Council

Founded in 1913, the National Safety Council (NSC) is an advocate for safety and health. It is a "nonprofit, non-governmental international public service organization dedicated to improving safety, health and environmental well-being of all people" (National Safety Council [NSC], 2003a). The Council provides guidance on injury prevention and focuses on four major areas of operation:

1) training;

2) educational programs and materials;

3) consulting; and

4) advocacy leadership.

The NSC has a vast array of services and knowledge to offer. Areas of expertise include regulatory and non-regulatory issues. Some examples include OSHA 10-Hour General Industry, Bloodborne Pathogens, First Aid/CPR, Confined Space and PPE courses. In addition, they also provide advanced safety certificate courses in Safety Training Methods, Safety Management Techniques, Principles of Occupational Safety and Health, and Fundamentals of Industrial Hygiene (NSC, 2003b). .

American Association of Occupational Health Nurses

The American Association of Occupational Health Nurses (AAOHN) was founded in 1942 with 300 nurses from 16 states. The purpose at the time of formation was two-fold: to improve occupational health programs and services, and to enhance career opportunities for occupational and environmental health nurses (American Association of Occupational Health Nurses [AAOHN], 2003b). Since that time, AAOHN has positioned itself as the "primary association for the largest group of health care professionals serving the workplace" (AAOHN, 2003b). It is a professional organization for registered nurses who provide health care services for workers at their place of employment. AAOHN is very active in employee health and safety and has made numerous recommendations to OSHA and NIOSH regarding these issues.

The primary function of OEHNs is to promote and restore health, prevent illness and injuries, and protect the employee from work related and environmental hazards (AAOHN, 2003a). As members of AAOHN, occupational

and environmental health nurses have access to a number of tools to safeguard and promote the health and wellness of their employees. They are able to use this information to impact their practice resulting in a safer work environment for the employee and employer. Areas of expertise that they bring to the workplace that impact safety include:

- identifying hazards;
- evaluating occupational health surveillance programs;
- conducting and interpreting results of occupational health surveillance programs;
- recommending elimination and removal of hazards;
- monitoring use of PPE; and
- providing assistance and expertise to other members of the occupational health team, i.e. industrial hygienist, engineers, etc.

OEHNs, as members of AAOHN, are able to expand their expertise in these and other areas, because of the extensive research and training that is provided by the organization. As a result, they are able to impact worker safety not only in the work environment, but also at home and in the community.

American Industrial Hygiene Association

Prevention of occupational disease and injury is the foundation of the American Industrial Hygiene Association (AIHA). It is an association made up primarily of industrial hygienists but is open to other occupational health, safety,

and environmental professionals (American Industrial Hygiene Association [AIHA], 2003a). This organization is involved in legislative and regulatory affairs to assist the profession in improving the health and safety of workers.

The AIHA is very proactive in employee safety and has made numerous recommendations to OSHA, NIOSH, Congress, and employers regarding these issues (AIHA, 2003b). Their position statement approved on February 6, 2001 clearly stated that workers have a:

- right to a safe and healthy workplace;
- right to information about their job hazards;
- right to training about health and safety;
- right to refuse to perform unsafe work; and
- right to form and serve on effective health and safety committees.

As a part of the occupational and environmental health interdisciplinary team, the AIHA makes a significant contribution to employee health and safety (AIHA, 2003c).

American Conference of Governmental Industrial Hygienist

The American Conference of Governmental Industrial Hygienists (ACGIH) also plays a significant role in workplace safety. It too is an association of industrial hygienists that encourages sharing of information among its members and the occupational and environmental health communities to provide a safe work environment (American Conference of Governmental Industrial Hygienists

[ACGIH], 2003). Unlike the AIHA this organization has twelve committees who establish an annual work plan to focus on a range of topics. These topics include:

- chemical substance Threshold Limit Values (TLVs);
- physical agent TLVs;
- bioaerosols;
- biological exposure indices;
- agricultural safety and health;
- air sampling instruments;
- computer;
- construction;
- industrial ventilation;
- infectious agents;
- international; and
- small business.

American Society of Safety Engineers

As the world's oldest and largest professional safety organization, the American Society of Safety Engineers (ASSE) has played a key role in workplace safety (American Society of Safety Engineers [ASSE], 2003a). Its more than 30,000 members "manage, supervise and consult on safety, health and environmental issues in all industries, government, insurance and education"

(ASSE, 2003b). The society is proactive at the state and national level and has been influential in governmental affairs, which have impacted workplace safety. Some areas in which they have played a key role include:

- working with the National Safety Council to research plastic eye protection;
- working with NIOSH to develop an accident protection program; and
- sponsoring research with the Air Force, which led to advances in fall protection belts, and harnesses, which were later realized in American National Standards.

In addition, ASSE members have also been appointed to OSHA positions, including the Assistant Secretary of Labor (ASSE, 2003a). This position was held by George Guenther who was appointed by President Nixon in 1971. The society also worked closely with NIOSH to develop an accident potential recognition program. As a result of this collaboration, in 1986 the United States Congress passed legislation commemorating National Safety Week as an observance of important safety and health issues (ASSE, 2003a).

American College of Occupational and Environmental Medicine

Dedicated to the prevention and management of occupational and environmental injury, illness and disability, and promotion of health and productivity of workers, their families and communities, the American College of Occupational and Environmental Medicine is the nation's largest medical society (American College of Occupational and Environmental Medicine [ACOEM],

2003a). This organization is dedicated to promoting the health and safety of employees through research, education, clinical care, and preventive medicine.

In addition to the above, members of the organization also provide training to other health care professionals on a variety of subjects such as multiple chemical sensitivities, reproductive hazards, radon, environmental tobacco smoke, and toxicology (ACOEM, 2003b). They are active in employee safety and health and are available as a resource to employers regarding health and safety issues in the workplace.

Board of Certified Safety Professionals

The Board of Certified Safety Professionals (BCSP) is a nationally accredited board that certifies practitioners in the safety profession (Board of Certified Safety Professional [BCSP], 2003). They review the academic and professional experience of the applicants to ensure that they meet the qualification of safety professionals. In addition to their academic and professional experience, certification from the board requires that the safety professional must be able to:

- anticipate, identify, and evaluate hazardous conditions and practices;
- develop hazard control designs, methods, procedures, and programs;
- implement, administer, and advise others on hazard controls and hazard control programs; and
- measure, audit, and evaluate the effectiveness of hazard controls and hazard control programs (ASSE, 2003c).

CHAPTER IV

SAFETY AND THE ROLE OF THE OCCUPATIONAL AND ENVIRONMENTAL HEALTH NURSE

The occupational and environmental health nurse (OEHN) is a very important component of workplace safety. "Through their work in academia, government, health care facilities, and worksites, nurses play an important role in promoting safety and health for workers" (Higgins, et al., 2000, p. 336). As such, it is important the OEHN be familiar with the work environment and the hazards that may be present. They must know their employee population and be familiar with the work process. In addition, they must understand the employer's philosophy and commitment to safety.

Although the nurse may be part of an interdisciplinary team including safety specialists, industrial hygiene, physician, and ergonomists, it is important to realize that this may not be the case at all places of employment (Rogers, 1994). As such, it is important that the OEHN understands his/her responsibility and role in the health and safety of employees.

Anticipation and Recognition

Anticipation and recognition are the first two steps in preventing injury and illness at the workplace. Hazard anticipation is the ability to anticipate hazards that may occur during normal conditions and processes prior to implementation. It is the "potential for harm or damage to people, property, or the environment" (Manuele, 1994, p. 72). The OEHN must understand the work

process, changes that may take place during the process, the product produced, environment, and how the worker interfaces with the environment. He/she must understand the worker population and how any change in the work process may affect their health. An example of a change that may affect workers' health is an organization that plans to change from 8-hour shifts to 12-hour shifts. Hazard anticipation involves the ability to recognize that while chemicals may be safe for an 8-hour work shift, this may not necessarily be the case for a 12-hour work shift. Exposure beyond the 8-hour period may exceed the Threshold Limit Value.

Recognition is "the process of identifying and describing existing workplace hazards" (Salazar, 1997, p. 167). This involves going out into the workers' environment and observing the surroundings, the employees, and the work process. What tools are employees using? What chemicals are present? Is the correct PPE being worn? Are employees aware of any hazards? This also involves going into the break rooms and observing employees' hygiene practices. Are employees, who work with chemicals that become toxic when ingested, washing their hands prior to eating?

The OEHN must also be able to identify trends as part of the hazard recognition process. He/she must be aware that when employees present to the clinic with similar complaints, these complaints may be due to a work hazard. It is the responsibility of the OEHN to further investigate to determine if the workplace is the root cause of the complaints. If the OEHN is not aware of all of the hazards associated with a proposed process, change, or installation of new equipment, he/she needs to question the other members of the interdisciplinary or

management team in order to learn about the upcoming change. It is also important that the OEHN understand the employee population and the health risks present so that he/she can identify how a particular process may affect employee safety. For instance, as the workforce ages the OEHN must take into consideration that the metabolism of an older employee may be slower than a younger employee thereby making them more susceptible to side effects associated with chemicals.

Hazard Identification

Hazard identification is recognizing the potential for harm to people, property, and the environment (Salazar, 1997). For the OEHN, this process involves inspection of the workplace and review of background information on work practices, processes, and materials used. It requires interviews with company representatives and employees, other members of the interdisciplinary team, and a direct observation of work practices, processes, and control measures (Rogers, 1994; LaDou, 1997; Salazar, 1997). The best source of obtaining this information is through inspection of the workplace. Often this is referred to as a "walkthrough survey". Once a hazard is identified, it is important that the OEHN facilitates removal of the hazard or recommends controls to minimize the potential harm.

Walkthrough surveys are encompassing and may be formal, informal, or general in nature (Salazar, 1997). A formal inspection is a scheduled inspection that is usually performed by a team of occupational and safety professionals and includes a written report of the inspection. Informal inspections are usually done

at the beginning of a shift and focus on routine work. An example of this may be a daily fork truck inspection. A general inspection may be done for insurance purposes, fire code compliances, union or corporate audits or "to assure compliance with legal requirements (Salazar, 1997, p. 168). A formal or general inspection will usually include:

- work environment;
- hygiene;
- training;
- housekeeping;
- emergency equipment;
- evacuation;
- fire protection;
- personal protection equipment;
- management involvement;
- work practices;
- inspection of flammable liquids;
- compressed gasses;
- acids and poisons;
- high hazard processes;
- pressure equipment;

- electrical equipment;
- chemicals; and
- mechanical and heat hazards.

An example of a walkthrough survey can be found in Figure 4.1.

Another method the OEHN may use to identify hazards is a job hazard analysis for a specific process or employee complaint. An example of this is the NIOSH Ergonomic Hazard checklist, Figure 4.2 (NIOSH, 2003e). The OEHN may choose to do this type of investigation when the employee presents with a specific complaint. This may also be done to determine the safest way to perform a specific task or identify potential health hazards (Salazar, 1997).

With the assistance of other members of the team, the OEHN may also initiate an accident investigation. According to OSHA,

> "Thousands of accidents occur throughout the United States every day. The failure of people, equipment, supplies, or surroundings to behave or react as expected causes most of the accidents. Accident investigations determine how and why these failures occur. By using the information gained through an investigation, a similar or perhaps more disastrous accident may be prevented" (2003d).

It is important that the OEHN participate in this investigation to understand the work process, or incident that caused the injury. By conducting the investigation in a caring, non-blaming way, the OEHN may develop a better rapport with the injured worker and supervisor (Salazar, 1997).

FIGURE 4.1

SAMPLE WALKTHROUGH SAFETY CHECKLIST

Location: **Date:**

Inspected By:

	Yes	No	N/A	Action Required	Date to be Completed
Work Environment					
Ventilation					
Temperature and humidity control					
Noise levels					
Vibration					
Lighting					
- general purpose					
- for a particular task					
- absence of glare					
- work area					
- corridors					
- exterior					
- layout of work area					
- furniture					
Ergonomics					
Hygiene					
Separate work and eating areas					
Drinking water					
Washing facilities					
Toilets					
Work clothes lockers and hanging areas					
Regularly cleaned area					
Training					
Task specific					
Process specific					
Management					
Refresher courses					

	Yes	No	N/A	Action Required	Date to be Completed
Housekeeping **Storage** -racks, bins, shelves -aisles and walkways kept clear -neat and orderly -not too high -heavy items kept low -sufficient space to access items **Removal of combustibles** **Rubbish** -regularly removed -sufficient bins					
Emergency Equipment **Procedures** **Contact telephone numbers** **Safety showers** **Eye wash stations** **Respirators/SCBA** **First aid kit** **First responders** -name -location **Emergency lighting** **Alarm system**					
Evacuation **Procedures established** **Fire brigade** **Display of floor plans and escape routes** **Practices twice yearly** **Communication system** **Exits unobstructed and open from inside**					

	Yes	No	N/A	Action Required	Date to be Completed
Fire Protection **Fire separation** -walls and floors -doors and windows -ceilings and ducts -vertical shafts **Isolation of risk areas** **Fire detection system** **Alarm and emergency evacuation system** **Alarms audible in all areas** **Fire extinguisher** -type -location -serviced -operator trained **Hose reels** **Fire hydrants** **Automatic fire fighting system** **Access for fire brigade**					
PPE (consider correct selection, location, information and warning signs and maintenance) **Coats/overalls** **Eye protection** **Gloves** **Footwear** **Respirators** **Hard hats** **Hearing protection**					

	Yes	No	N/A	Action Required	Date to be Completed
Management					
OS&H policy displayed					
OS&H committee					
-employee representative					
-regular meetings					
Responsibilities defined					
Safety manual					
Qualifications and training of operators					
Accident and incident reporting					
Hazard reporting and follow up					
Provision for visitors					
Monitoring effectiveness of OS&H program					
Work Practices					
Avoid manual handling					
Use mechanical handling equipment					
Confined space procedures					
Permits					
-contractors					
-hot work					
-lockout/tagout					
Fall protection					
Not working alone					
Flammable Liquids					
Stored in a flammable liquids cabinet					
Suitable containers					
Static energy control					
Correct signage					
Class B fire extinguisher nearby					

	Yes	No	N/A	Action Required	Date to be Completed
Compressed Gases Reticulated from outside the building Number of cylinders inside rooms Cylinders secured Segregation of incompatible gases Transported properly Tamper proof Correct signage Check lines carrying gas					
Acids and Poisons Separate storage Corrosive/acids cabinet Not excessive quantities Correct signage Neutralizing agents					
High Hazard Process Detailed preliminary study Special protective equipment Independent assessment					
Pressure Equipment Legislation and code compliant Safety devices Correct signage Regularly maintained					

	Yes	No	N/A	Action Required	Date to be Completed
Electrical Equipment **NEC compliant** **Qualified electrician used to install** **Regular maintenance** **Sufficient circuits** **Condition of plugs and leads**					
Chemicals **MSDS** **Register of chemicals** **Containers** -suitable -sufficient -location **Waste collection and disposal spill kit** -location -appropriate -easy access **Eye wash stations**					
Mechanical and Heat Hazards **Guarding of machines** **Maintenance of machines** **Emergency isolation switches** **Cranes and hoists** -serviced -marked **Guard rails** **Ladders and steps** **Bays and screens for welding and grinding**					

FIGURE 4.2

NIOSH Ergonomic Checklist

NIOSH

Elements of Ergonomics Programs

A Primer Based on Workplace Evaluations of Musculoskeletal Disorders

Toolbox

Tray 5-B

Tray 5-B Ergonomic Hazard Identification Checklist

Answer the following questions based on the primary job activities of workers in this facility.

Use the following responses to describe how frequently workers are exposed to the job conditions described below:

> Never (worker is never exposed to the condition) Sometimes (worker is exposed to the condition less than 3 times daily) Usually (worker is exposed to the condition 3 times or more daily)

	Never	Sometimes	Usually	If USUALLY, list jobs to which answer applies here
1. Do workers perform tasks that are externally paced?				
2. Are workers required to exert force with their hands (e.g., gripping, pulling, pinching)?				
3. Do workers use hand tools or handle parts or objects?				
4. Do workers stand continuously for periods of more than 30 min?				
5. Do workers sit for periods of more than 30 min without the opportunity to stand or move around freely?				

6. Do workers use electronic input devices (e.g., keyboards, mice, joysticks, track balls) for continuous periods of more than 30 min?				
7. Do workers kneel (one or both knees)?				
8. Do workers perform activities with hands raised above shoulder height?				
9. Do workers perform activities while bending or twisting at the waist?				
10. Are workers exposed to vibration?				
11. Do workers lift or lower objects between floor and waist height or above shoulder height?				
12. Do workers lift or lower objects more than once per min for continuous periods of more than 15 min				
13. Do workers lift, lower, or carry large objects or objects that cannot be held close to the body?				
14. Do workers lift, lower, or carry objects weighing more than 50 lb?				

GLOSSARY OF TERMS

Facility: The location to which employees report each day for work. For situations in which employees do not report to any fixed location on a regular basis but are subject to common supervision, the facility may be defined as a central location where other OSHA records are maintained. (Note: Synonymous with establishment, as defined in OSHA recordkeeping requirements.)

Primary job activities: Job activities that make up a significant part of the work or are required for safety or contingency. Activities are not considered to be primary job activities if they makeup a small percentage of the job (i.e., take up less than 10% of the worker's time), are not essential for safety or contingency, and can be readily accomplished in other ways (e.g., using equipment already available in the facility).

Externally paced activities: Work activities for which the worker does not have direct control of the rate of work. Externally paced work activities include activities for which (1) the worker must keep up with an assembly line or an independently-operating machine, (2) the worker must respond to a continuous queue (e.g., customers standing in line, phone calls at a switchboard), or (3) time standards are imposed on workers.

Management Philosophy and Commitment

It is important that the OEHN understands that the safety of an organization is dependent upon the philosophy and commitment of the management of that particular organization. According to Rogers this will be "reflected in policies and programs for a healthful work environment, resources to support program activities, including adequate levels and types of health care professionals, promotion of education and research to improve worker health and safety" (1994, p. 191). The safety philosophy of a company is most evident when managers and supervisors demonstrate the safety policy (Frailey, 2003). This may be evidenced by management involvement in safety meetings, walkthrough surveys, and commitment to mitigation of hazards.

In addition to the above, the OEHN can determine management's commitment and philosophy of safety by evaluating the preventive maintenance programs in place and the level of training that is given to employees before they perform a new task. It is also important to evaluate if production is emphasized more than safety. Although all business and industry will have a profit motive, it is also important that they have a commitment to the employee health and safety (Rogers, 1994).

The American Society of Safety Engineers (ASSE) recently conducted a poll of their members on their website questioning if they felt management was committed to workplace safety or believe management thinks safety contributes to the bottom line. Of the 5,000 members of the ASSE who participated, over half felt that management was not committed to safety or that management felt that

safety contributed to the bottom line, or profitability (Occupational Hazards, 2002). Although this poll may not be reflective of all industries, it is important that the OEHN realize the motive for his/her placement within the organization. Has the OEHN been hired to treat injuries at the workplace in hopes of decreasing workers' compensation costs and OSHA recordables, or has management indicated a desire to provide a safer work environment for their employees?

Employee Involvement

The OEHN must realize that employee involvement is critical to the success of all safety programs. The employee must be part of the safety team, involved in walkthrough surveys and task analysis, trained to recognize hazards, and encouraged to offer input when changes are to be implemented to the work process. According to Rogers, "employee interest in helping to identify problems needing correction will be increased if their participation is not only requested but valued" (1994, p. 199).

Employee involvement begins with training. A critical function of the OEHN is providing effective employee training in safe working habits and healthy lifestyles (Lusk, 2002). Some areas of training that the OEHN may provide include:

- proper use of personal protective equipment (PPE);
- correct material handling techniques;
- hazardous chemical education;
- respiratory protection; and

- hearing conservation.

When providing training it is critical that the OEHN understand the workers' perception of their risk and what they perceive as hazards. It is important to note that this may be different from the employer's perception (Sofie, 2000). Studies have shown that when employees, supervisors, and management are given training in recognizing and identifying hazards, their perception of risk and hazards increases. The OEHN is able to identify health and safety hazards that before their training they would not have identified. (Lippin, et al., 2000; Mukherjee, et al., 2000).

Learning needs must also be taken into consideration. While some individuals may learn through lectures, others require hands on demonstration. Most individuals learn best through a combination of both approaches (Soife, 2000; Jensen, 2001). It is also recommended that employees be part of the training process. "Programs should expand workers' roles to include anything and everything that must be done in order to put on a training course" (McQuiston, 2000, p. 593). Another important aspect of employee involvement is to understand the barriers to safety involvement. If employees are not wearing PPE or following safety rules the OEHN should examine the motivation behind the behavior. An example of this is a recent follow up report written to address why emergency responders at the attack of the World Trade Center failed to wear the appropriate personal protective equipment. A common complaint was the availability and performance of the equipment provided. It was found that the steel-toed shoes were uncomfortable and caused blisters after an extended period.

Gloves became hardened and uncomfortable when wet. The available goggles were not comfortable and the wrap around sunglasses made visibility difficult in low light situations. Hearing protection was available but it was difficult to communicate on radios when worn (Jackson, et al., 2002). It is important that the OEHN realize that these same complaints may be a barrier at his/her workplace.

Hazard Prevention and Control Strategies

Ideally, hazards should be eliminated from the workplace, but this is not always possible. Sometimes the work process requires that employees interface with a variety of agents that could pose a hazard to them. These hazards may include chemicals, machinery, noise, heat and cold, working at heights, etc. While the employer may try to eliminate these hazards, some processes cannot be free of hazards. An example is an industry that makes hazardous chemicals. Although every attempt may be made to reduce the hazardous nature of the job, the fact that a hazardous chemical is the end product increases the risk of exposure. Another example is a worker in the meat packaging industry. The employer may provide cut resistant gloves and clothing but the risks of lacerations remain. It is important that the OEHN understand the hazard prevention and control strategies that may be implemented. The control strategy is dependent upon the work process, workers, and the workplace environment.

As mentioned previously, if possible, substitution or elimination of a hazard should be performed (Rogers, 1994; Salazar, 1997). According to Salazar, this process should be approached with care to ensure that the substituted equipment, chemical, etc. does not pose any health or safety risk (1997).

Examples of substitution and elimination include replacing noisy machinery with quieter equipment, using less toxic or flammable chemicals, and using conveyer systems to move heavy boxes rather than manually moving them.

When elimination strategies cannot be implemented, engineering controls should be considered. This may require using local exhaust to remove air contaminants, ensuring that equipment is guarded, using conductive mats to dissipate static electricity, applying noise barriers, and having work stations ergonomically designed (Salazar, 1997). It is important that the OEHN be aware of these types of controls as he/she may be called upon to make recommendations.

The third type of control is administrative. Administrative controls "are supervisory and management practices to promote safe work behavior that eliminate or limit hazard exposures (Salazar, 1997, p. 191). This may involve limiting the amount of time in a specific area to decrease exposure to noise, chemicals, or heat. Rotating workers between several tasks may also be done. Another form of administrative control is the use of permits such as a confined space or hot work permit. This type of control requires that a system is in place to evaluate the hazard and specify safe work practices. It also identifies personal protective equipment (PPE) needed to perform a task safely and ensures that authorization is granted before beginning the task.

The final and least recommended type of control measure is utilization of PPE. Types of PPE include hard hats, safety shoes, respirators, safety glasses, gloves, and hearing protection. The OEHN should understand that the protection

afforded by these items is affected by proper fit and use of equipment. Employees must be trained in proper use and maintenance techniques.

Evaluation of Program

The continuous improvement of a safety program depends not only on the identification, elimination, and control of hazards, but also evaluation of the safety program (Cagno, et al., 2001). If the safety program is effective, the OEHN should expect to see:

- management involvement;
- employee participation in hazard identification;
- compliance wearing personal protective equipment;
- decrease in number of injuries and workplace illnesses;
- frequent safety meetings to discuss identified or potential hazards;
- increased awareness of personal safety; and
- increased employee satisfaction.

If these characteristics are not present, the OEHN should then re-evaluate the program to determine what changes are needed. This may require increased management involvement, retraining of workers, etc. The OEHN, employees, management, and other members of the interdisciplinary team should be involved in the ongoing process of evaluating the safety program. It is this process that will determine the effectiveness of a safety program.

CHAPTER V

DISCUSSION AND CONCLUSIONS

Occupational health professionals are an essential part of the interdisciplinary team that impacts employee safety. As a member of this team, OEHNs are in a unique position to be proactive in employee safety. Because OEHNs are often located at the workplace, they are easily accessible to employers, employees, and other members of the team. OEHNs are uniquely qualified to identify potential hazards before they become apparent to others. Employees will often report to the OEHN muscle soreness and pain or other vague symptoms associated with a task. It is imperative that the nurse follows up on these complaints to determine the cause.

As mentioned previously, many different safety programs can be implemented at the workplace. OEHNs should be knowledgeable of these programs and understand their implications. For instance, worksites that offer incentives for working a period of time without an OSHA recordable may see a decrease in reported work injuries but an increase in absences related to personal injuries. OEHNs should be aware that these absences might be a result of work injuries that are reported as personal injuries so that a particular incentive goal may be reached.

An exemplary safety program must involve commitment from management to provide a safe workplace. If employees feel that a work process is unsafe, they should have the ability to stop the process until the hazard can be mitigated. Management should encourage employees to recognize and report

hazards that may be present in the workplace. Although management has a responsibility to provide a safe workplace, employees must also understand that they have a role in their own safety. They have a responsibility to correctly wear the PPE provided and are responsible for their safety while performing work. Unsafe behaviors should not be tolerated and procedures should be followed at all times.

Because of their unique training and expertise, OEHNs can be instrumental in workplace safety and health. Their expertise can benefit management, employees, and other members of the interdisciplinary team. To do this OEHNs must know characteristics of the employee population and their work environment. They must also understand their roles and responsibilities in the following seven areas and resultant impact on workplace safety. Each of the following areas will be discussed:

1. continuing education;
2. management resource;
3. interdisciplinary team member;
4. hazard identification;
5. employee involvement;
6. training; and
7. employee safety and health advocate.

Continuing education is a very important area for OEHNs to function as an influential member of the safety team. This may be formal education through

classroom training or information gained through professional affiliations or journals. OEHNs must be knowledgeable regarding the work processes and hazards that may be present at the workplace. They must also be able to quickly identify potential work related illnesses and injuries. For example, if an employee presents with vague symptoms, the OEHN needs to have the expertise to realize that the symptoms may not be a stomach virus but rather exposure to something in the workplace.

It is also important that OEHNs stay current with federal and state regulations in the workplace. In many organizations employers rely on OEHNs for compliance supervision. They may also be required to maintain the organization's recordkeeping. It is imperative that OEHNs understand any changes in the recordkeeping rule and the implications they may impose.

The second area is for OEHNs to serve as a resource to management. Often management may implement changes to the work environment or process without being fully aware of the implications. An example of this may be the employer who wants to change from an 8-hour straight shift to a 12-hour swing rotation. Knowing that this type of rotation may not only affect employee health, but also safety due to longer hours and increased fatigue, the OEHN can give objective information that management can take under advisement before making a decision.

In order for management to consider OEHNs a valuable resource, it is important that OEHNs also understand the business perspective and incorporate it when making recommendations. What may be in the best interest of the

employee may not necessarily be an option for the employer from a business sense. For example, an employee may be required to take cases of a product manually off an assembly line and stack it until it is large enough to be moved by a fork truck to the shipping area. From an ergonomic and safety perspective it would be safer to install a conveyer system that would completely remove any manual tasks. Although this may be the case, the employer may not have the money available to install a system. As such, OEHNs may need to make recommendations that will benefit both the employer and employee.

Third, OEHNs must understand their role as part of the interdisciplinary team. Depending upon the employer, OEHNs may work alone or they may be part of a team consisting of industrial hygiene, safety, line supervisors, engineers and upper management. It is important that OEHNs realize that their approach, or concern, may not be equally shared by other team members. Each member of the team, while committed to safety, may have a different approach. Industrial hygiene may focus on identification and abatement of hazards such as increasing ventilation in a work area to prevent the use of respirators. Safety may focus on the employee's work area and behavior. An example of this may be implementing a cleaner, more organized work area to decrease injuries or implementing safety programs to help the employee identify safe work practices. Management and supervisors may focus on production and profitability. The more efficiently an employee works, more products can be produced thereby increasing revenue. For OEHNs, the health and well being of the employee is of the utmost importance. They must realize that the employee who has chronic

obstructive pulmonary disease may not be able to wear a negative pressure respirator. Therefore, they can make recommendations to protect the employee. All members can learn from each other's expertise and make a significant contribution to employee safety.

The fourth area, hazard identification, becomes even more important for OEHNs in the absence of the interdisciplinary team. It is important that OEHNs understand all components of the work process. They need to know what chemicals are being used and the symptoms of acute and chronic exposures. They must understand what tools are used to perform the job and the environmental exposures that may exist. Thinking outside of the box is necessary. They must ask themselves the "what ifs". If a process is implemented, what may be the outcome or impact on health and safety?

The fifth area is employee involvement. In order to impact safety OEHNs must have employee buy in. Employees must understand the importance of wearing their PPE. They must know how to identify hazards. Employee involvement can also be obtained when OEHNs understand the employee work process. They should not expect the employee to always come to them, but rather, they should go to the employee. For example, OEHNs should go to the worksite and perform the task with the employee. This helps them understand why the employees' arms and shoulders hurt, or why they present with lacerations and back strains. Not only will this opportunity allow OEHNs to understand the work process, but it also sends a message to the employee that someone cares and that an alternative way to perform a task may exist. They should question the

employee for possible alternatives to performing a task. Because employees are familiar with the tasks associated with their work process, they are the best source of feedback when seeking to implement a new safety process. Employees will give feedback on the feasibility of a new process. In order to foster employee involvement OEHNs should encourage employee attendance and participation at safety meetings.

The sixth area, training, is critical to every safety program and process. OEHNs should provide training in a manner that will be hands on and interactive. They should make every attempt to make it interesting and interactive. In addition, OEHNs should take employees to their worksite and specifically show them the hazards that are present in their area.

OEHNs should also provide training at the employees' education level. Principles of adult learning should be followed, including teaching at an appropriate educational level and in terms employees understand. If employees do not appear to understand what is said, ask for feedback on what they think was said. For example, advising employees that irritant contact dermatitis may result if proper PPE is not worn may not be clearly understood. Employees may have a better understanding if they are taught that redness, itching, swelling, and rashes may develop if the correct gloves are not worn. OEHNs should be cognizant that safety training is only as good as the change in behavior that is noted.

While OEHNs have many roles that affect employee safety, it is important that they understand their most important role, to protect the health and safety of employees. OEHNs have an obligation to notify employers that a work process

may be harmful to the employee. Employees have the right to be notified of any hazards that may be present within the work environment. OEHNs have influence, and will continue to influence employee safety. They are an important member of the safety interdisciplinary team and are instrumental in the safety and health of employees and the workplace.

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